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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,553	12/28/2004	Keisuke Kawamura	263791US2PCT	2851
22850	7590	02/14/2006	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.			COLEMAN, WILLIAM D	
1940 DUKE STREET			ART UNIT	
ALEXANDRIA, VA 22314			PAPER NUMBER	
			2823	

DATE MAILED: 02/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/519,553

Applicant(s)

KAWAMURA ET AL.

Examiner

W. David Coleman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 December 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

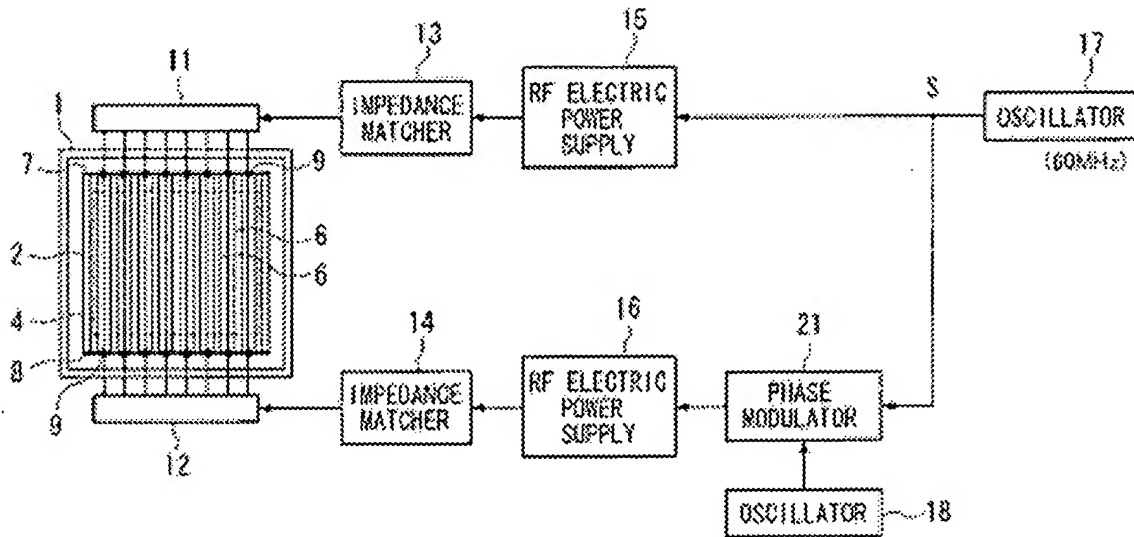
1. Figure 5-8G, should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Laermer et al., U.S. Patent 6,720,268 B1. Applicants AAPA substantially teaches a high-frequency plasma generating apparatus as claimed, please see FIGS. 5 and 6, where AAPA teaches the following limitations.



3. Pertaining to claim 1, AAPA teaches a high-frequency plasma generating apparatus having a reaction chamber in which a ground electrode 3 (not shown in prior art figure 5, however shown in figure 6) is disposed and a discharge electrode 6 is disposed opposite to the ground electrode 3, so that a substrate 4 as a processing object will be placed in close contact with the ground electrode, and a high-frequency voltage will be applied to the discharge electrode 6 so as to generate plasma between the ground electrode and the discharge electrode, the high-frequency plasma generating apparatus comprising:

a first high-frequency generator 15 which generates a first high-frequency voltage,

a first electric power feeder 11 which applies the first high-frequency voltage to a feeding point disposed on a lateral portion of the discharge electrode,

a second high-frequency generator 16 which generates a second high-frequency voltage,

and

a second electric power feeder 12 which applies the second high-frequency voltage to a feeding point disposed on another lateral portion of the discharge electrode.

However AAPA fails to teach wherein the second high-frequency voltage has the same frequency as that of the first high-frequency voltage and has a phase, which varies with a low-frequency signal, which is modulated by a predetermined modulation signal. Laermer teaches wherein the second high-frequency voltage has the same frequency as that of the first high-frequency voltage and has a phase, which varies with a low-frequency signal, which is modulated by a predetermined modulation signal (see fourth embodiment, column 9, lines 1-61). In view of Laermer it would have been obvious to one of ordinary skill in the art to incorporate the second high frequency voltage modulated with a low-frequency signal because the low-frequency modulation signal from an additional essentially known low-frequency generator provided is supplied for the purpose for amplitude modulation (column 9, lines 14-18).

4. Pertaining to claim 2, AAPA teaches a high-frequency plasma generating apparatus having a reaction chamber in which a ground electrode is disposed and a discharge electrode is disposed opposite to the ground electrode, so that a substrate as a processing object will be placed in close contact with the ground electrode, and a high-frequency voltage will be applied to the discharge electrode so as to generate plasma between the ground electrode and the discharge electrode,

the high-frequency plasma generating apparatus comprising:

a high-frequency oscillator 17 which generates a high-frequency signal,

a first high-frequency generator 15 which amplifies the high-frequency signal from the high-frequency oscillator to yield a first high-frequency voltage, and which outputs the first high-frequency voltage,

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a first electric power feeder **11** which applies the first high-frequency voltage to a feeding point disposed on a lateral portion of the discharge electrode **6**,

a phase modulator **21** which modulates the phase of the high-frequency signal from the high-frequency oscillator with the low-frequency signal,

a second high-frequency generator **16** which amplifies the high-frequency signal modulated by the phase modulator to

yield a second high-frequency voltage, and which outputs the second high-frequency voltage, and

a second electric power feeder **12** which applies the second high-frequency voltage to a feeding point disposed on another lateral portion of the discharge electrode. However, AAPA fails to teach a low-frequency oscillator which, generates a low-frequency signal which is modulated by a predetermined modulation signal. Laermer teaches a low-frequency oscillator which generates a low-frequency signal which is modulated by a predetermined modulation signal. In view of Laermer it would have been obvious to one of ordinary skill in the art to incorporate a low frequency oscillator which, generates a low frequency signal because the low frequency signal is provided for amplitude modulation (column 9, lines 14-18).

5. Pertaining to claim 3, AAPA teaches a high-frequency plasma generating apparatus according to claim 1 or 2, wherein the discharge electrode is a ladder-shaped electrode formed by disposing a plurality of longitudinal electrode rods between two transverse electrode rods, and the feeding point is disposed on the transverse electrode rods (see Applicants disclosure of background art on page 2 last paragraph).

6. Pertaining to claim 4, AAPA teaches a high-frequency plasma generating process in which a substrate as a processing object is placed in close contact with a ground electrode, which is disposed in a reaction chamber in which a discharge electrode is disposed opposite to the ground electrode, and a high-frequency voltage is applied to the discharge electrode so as to generate plasma between the ground electrode and the discharge electrode,

the high-frequency plasma generating process comprising:

applying a first high-frequency voltage to a feeding point disposed on a lateral portion of the discharge electrode, and

applying a second high-frequency voltage to a feeding point disposed on another lateral portion of the discharge electrode, the second high-frequency voltage having the same

frequency as that of the first high-frequency voltage and having a phase which varies with a low-frequency signal, which is modulated by a predetermined modulation signal.

7. Pertaining to claim 5, AAPA teaches a process for cleaning a high-frequency plasma generating apparatus having a reaction chamber in which a ground electrode is disposed and a discharge electrode is disposed opposite to the ground electrode, so that a substrate as a processing object will be placed in close contact with the ground electrode, and a high-frequency voltage will be applied to the discharge electrode so as to generate plasma between the ground electrode and the discharge electrode,

the process for cleaning the high-frequency plasma generating apparatus comprising:

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applying a first high-frequency voltage **15** to a feeding point **11** disposed on a lateral portion of the discharge electrode **6**, and

applying a second high-frequency voltage to a feeding point disposed on another lateral portion of the discharge electrode **7**, the second high-frequency voltage having the same frequency as that of the first high-frequency voltage. However, AAPA fails to teach introducing a halogen compound such as NF_3 , CF_4 , CCL_4 , SF_6 into the reaction chamber, and having a phase which varies with a low-frequency signal, which is modulated by a predetermined modulation signal. Laermer teaches introducing a halogen compound SF_6 into the reaction chamber. In view of Laermer, it would have been obvious to one of ordinary skill in the art to incorporate SF_6 into the reaction chamber of AAPA because the plasma etching system provides an anisotropic etching process (i.e., directional etching, see column 4, lines 18-19). With respect to the low frequency signal, Laermer teaches a low-frequency oscillator which generates a low-frequency signal which is modulated by a predetermined modulation signal. In view of Laermer it would have been obvious to one of ordinary skill in the art to incorporate a low frequency oscillator which, generates a low frequency signal because the low frequency signal is provided for amplitude modulation (column 9, lines 14-18).

Information Disclosure Statement

8. The information disclosure is being considered by the examiner.

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Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 571-272-1856.

The examiner can normally be reached on Monday-Friday 9:00 AM - 5:30 PM.

10. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



W. David Coleman
Primary Examiner
Art Unit 2823

WDC